

FIGURE 1

VAP-1 amino acid sequence (SEQ ID NO:1)

MAVLAVVLLLA CLERAVAQTFGCSNTKINDQARKMFYDAHNDARRSMAKGLE
PNKCGLLSGGKNVYELNWDCEMEAKAQEWADGCPSSFQTFDPTWQNYATYM
GSIADPLPYASMAVNGWWSEIRTVGLTDPDNKYTNSAMFRFANMANGKASAFG
CAYALCAGKLSINCIYNKIGYMTNAIIEYKGD ACTSDAECTTYSDSQCKNGLCYK
APQAPVVETFTMCPSVTDQSDQARQNFLDTHNKLRTSLAKGLEADGIAAGAFAP
MAKQMPKLVKY SCTVEANARTWAKGCLYQHSTSAQRPGLGENLYMISINNMP
KIQTAEDSSKAWWSELKDFGVGSDNILTQAVFDRGVGHYTQMAWEGTTEIGCF
VENCPTFTYSVCQYGPAGNYMNQLIYTKGSPCTADADCPGTQTCSVAEALCVIP

vap-1 cDNA nucleotide sequence (SEQ ID NO:2)

ATGGCGGTATTAGCAGTGGTACTACTTCTAGCATGCCTGGAGAGAGCGGTTG
CACAGACGTTCCGGCTGCTCTAACACCAAGATCAATGACCAGGCTCGTAAGAT
GTTCTATGATGCTCACAATGATGCAAGACGAAGCATGGCTAAAGGGCTTGAG
CCAAACAAGTGCGGACTCTTATCTGGTGAAAGAATGTTTATGAATTGAATT
GGGATTGCGAGATGGAAGCAAAAGCTCAGGAATGGGCAGACGGATGTCCCA
GCTCTTTCCAGACATTTGATCCAACATGGGGGCAGAACTACGCGACGTACAT
GGGATCGATTGCTGATCCGCTTCCATACGCTTCCATGGCTGTTAATGGGTGGT
GGTCGGAAATTAGAACCGTAGGACTTACGGATCCTGATAACAAGTACACTAA
CAGTGCAATGTTCCGATTTGCTAATATGGCAAATGGTAAAGCTTCAGCTTTTG
GATGTGCATACGCGTTGTGCGCAGGAAA ACTATCCATCAATTGCATTTACAA
CAAGATAGGATACATGACCAATGCTATCATTTATGAAAAAGGAGATGCCTGT
ACCAGTGACGCTGAATGCACCACCTACTCAGACTCACAATGCAAAAACGGTC
TTTGCTATAAGGCACCTCAAGCTCCAGTCGTTGAGACTTTCACAATGTGCCCT
TCGGTCACGGACCAGTCGGATCAGGCGCGTCAAACTTCTTGGACACCCATA
ACAAATTGCGTACAAGCCTTGCCAAGGGACTTGAAGCTGATGGAATTGCCGC
TGGAGCATTTGCACCAATGGCCAAGCAAATGCCAAA ACTGGTAAAATACAGC
TGCACAGTTGAAGCAAACGCCAGAACATGGGCAAAAGGATGCCTTTACCAGC
ATTCAACAAGCGCACAGAGACCAGGACTCGGTGAAAATCTTTATATGATCAG
CATTACAACATGCCTAAAATTCAAACCGCGGAGGACTCCTCAAAGGCTTGG
TGGTCCGAGTTGAAAGACTTCGGAGTCGGTTCTGACAACATTCTGACCCAAG
CAGTTTTTTGATCGTGGCGTTGGACATTACACACAAATGGCATGGGAAGGAAC
TACTGAAATTGGATGTTTTGTGGAGAATTGTCCAACATTCACTTATTCCGTAT
GCCAATATGGTCCAGCGGGAACTACATGAACCAACTAATCTATACCAAGGG
CTCACCATGCACAGCTGACGCCGATTGCCCAGGAACCCAGACATGCAGTGTC
GCTGAAGCATTATGTGTTATCCCTTAGTAAATTTTCTATGCAACTCTTTGAAA
GTCATAATAAATATGCAAAAATTAAAAAAAAAAAAA

FIGURE 1, cont.

VAP-2 amino acid sequence (SEQ ID NO:3)

MNVVLSAVTLFLIFRYAQTVNIEGSGGNDELLEQNVWNDVDDKVVEALGGLDD
ELLTEHVCNKSTITQLQQEILTTHNELRRSLAFGKQRNKRGLMNGARNMYKLD
WDCELASLANWSTSCPQHFMPSVLGSNAQLFKRFYFYFDGHDSTVHMRNA
MKYWWQQGEEKGNEDQKNRFYARRNYFGWANMAKGKTYRVGCSYIMCGDG
ESALFTCLYNEKAQCEKEMIYENGKPCCEDKDCFTYPSKCLVPEGLCQAPSMV
KDDGGSFQCDNSLVSDVTRNFTLEQHNFYRSRLAKGFEWNGETNTSQPKASQM
IKMEYDCMLERFAQNWANNCVFAHSAHYERPNOGQNL YMSSFSNPDPRLIHT
AVEKWWQELEEFGTIDNVLTPELWDLKGKAIGHYTQMAWDRTYRLGCGIANC
PKMSYVVCHYGPA GNRKNNKIYEIGDPCEVDDDCPIGTDCEKTTSLCVISK

vap-2 cDNA nucleotide sequence (SEQ ID NO:4)

ATGAACGTGGTCCTTTCCGCTGTCACCTCTTTTCTTATTTTTCGATATGCGCAG
ACTGTGAATATAGAAGGCAGTGGAGGAAATGATGAGCTTCTTGAGCAGAACG
TGTGGAACGATGTAGACGACAAGTTGTAGAAGCACTTGGTGGTCTTGATGA
TGAACCTGCTAACCGAACATGTGTGTAACAAATCAACGATCACTCAGCTACAG
CAGGAGATCATCTTGACAACCCACAATGAATTACGAAGATCATTGGCTTTTCG
GAAAGCAAAGAAACAAGAGAGGTCTCATGAACGGTGCAGAGAAATATGTATA
AACTGGATTGGGATTGTGAACTGGCATCACTTGCAGCCAATTGGTCAACCTCC
TGCCCTCAGCACTTTATGCCGCAATCGGTACTTGGCTCCAACGCTCAGCTTTT
TAAGCGTTTCTATTTTTATTTTGATGGGCACGACTCTACTGTACATATGCGAA
ACGCGATGAAGTATTGGTGGCAGCAAGGTGAAGAAAAAGGCAATGAGGATC
AGAAAAATAGATTCTATGCCAGACGAAATTATTTTGGATGGGCAAACATGGC
AAAAGGAAAAACATATCGAGTTGGATGCTCGTATATTATGTGCGGCGACGGT
GAATCTGCACTTTTCACTTGTCTTTATAACGAAAAAGCCCAATGCGAAAAAG
AAATGATTTACGAAAATGGAAAACCCTGCTGTGAGGATAAAGACTGTTTCAC
ATATCCAGGATCAAAATGTTTAGTACCTGAAGGATTATGTCAAGCACCTTCTA
TGGTAAAGGATGATGGAGGAAGTTTCCAATGTGATAACTCCCTTGTGTCAGA
TGTCACCCGCAATTTCACTTTGGAGCAACACAATTTTTATAGATCTCGTCTTG
CAAAAGGTTTTGAATGGAATGGAGAAACAAACACTTCCCAGCCAAAGGCTAG
TCAAATGATCAAAATGGAGTATGACTGCATGTTGGAACGGTTTGCACAAAAC
TGGGCAAATAATTGCGTTTTTGCACACTCGGCACATTACGAAAGACCGAATC
AGGGTCAGAATCTCTACATGAGTTCTTTCTCAAACCCTGATCCTAGAAGCCTT
ATACATACGGCCGTCGAGAAGTGGTGGCAGGAATTGGAGGAGTTCCGGTACTC
CAATTGATAACGTTCTGACACCCGAATTGTGGGATTTGAAAGGGAAAGCGAT
AGGACATTACACTCAGATGGCCTGGGATCGTACTTACCGTCTTGGTTGTGGAA
TCGCAAACGTGTCGAAGATGTCGTACGTGGTTTGTCACTATGGGCCAGCAGG
CAACAGAAAGAACATAAAATCTATGAAATCGGGGATCCTTGCGAAGTCGAT
GATGATTGCCCGATTGGAACAGATTGTGAAAAGACAACCTTCTTTATGTGTGAT
CTCAAATAA

3355027_1.DOC

FIGURE 2: Schematic diagram of nematode venom allergen protein domains

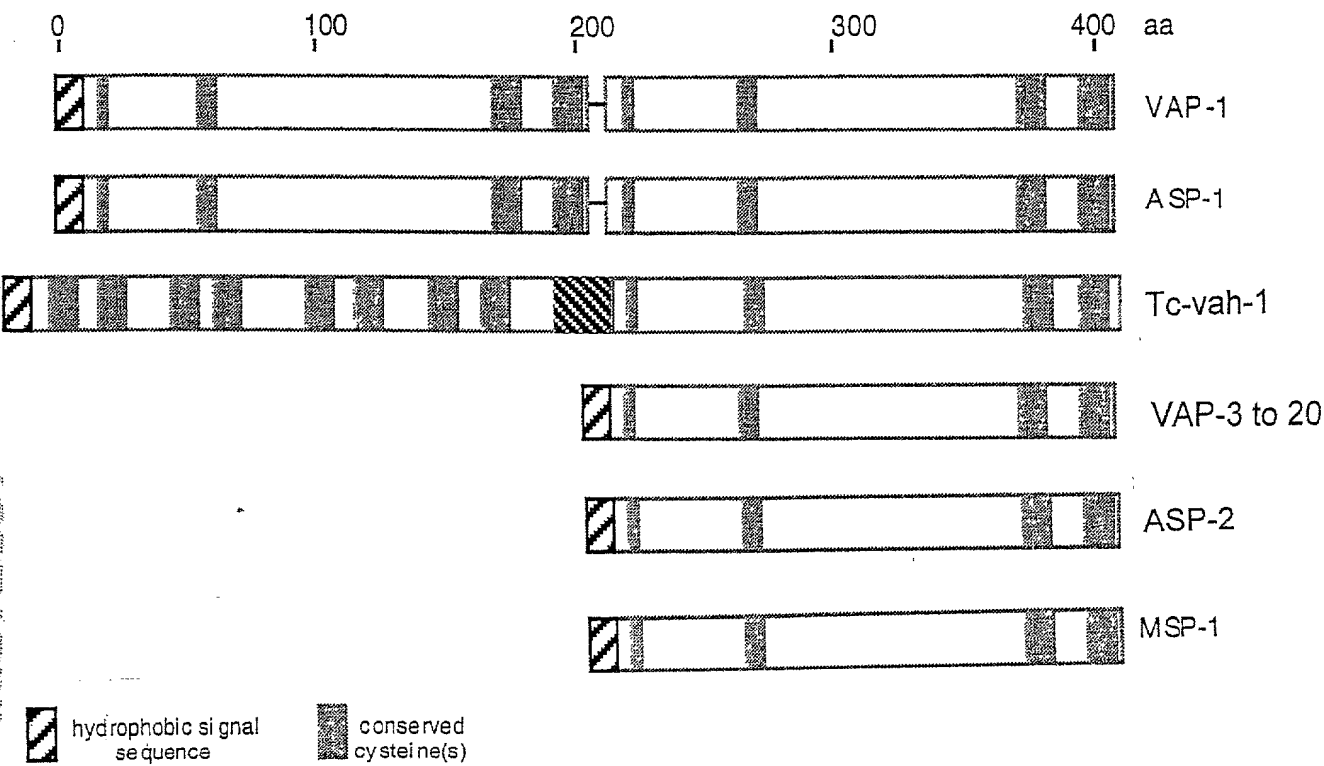
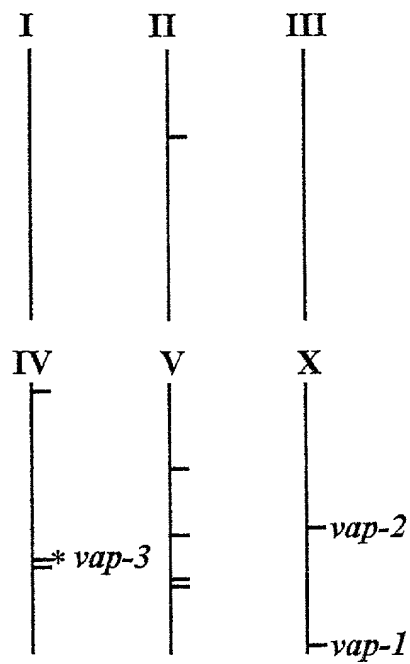


FIGURE 3

CLUSTAL W Alignment of VAP-1, VAP-2, and selected other nematode VA proteins.

VAP-1 N	1	.....MAVLAVVLLLA CLERA	22
VAP-1 C	1	.....PQAPV	11
VAP-2 N	1	MNVVLSAVTLFLIFRYAQT VNI EGSGGND ELL EQNVWNDVDDKVVEALGGLDDE	60
VAP-2 C	1	.....SFQ	3
ASP-1 N	1	.....MFSPVIVSVIFTIAFC DAS	26
ASP-1 C	1	.....DVPETNQQ	8
VAP-3	1	.....MNYLLLV	13
MSP-1	1	.....MSNKLIIIS	14
VAP-1 N	23	C SNTKIN - - DQARKMFYDAHNDARRSMAKGLEPN - - KCGLLSGGKNY YELN - WDC	76
VAP-1 C	12	CPSVT - DQS DQARQNF LDT HNKLR TSLAKGLEADGIAAGAFAPMAKQMPKLVKYSCT	70
VAP-2 N	61	CNKST - - ITQLQQEII LTT HNELRSLAFGKQRN - - KRGLMNGARNMYKLD - WDC	114
VAP-2 C	4	CDNSLV - - SDVTRNF TLEQHNFYRSLAKGF EWNG - ETNTSQPKASQMIKME - YDC	59
ASP-1 N	27	CSNSG - - ITDKDRQAF LDFHNNARRRYAKGV EDS - - NSGKLNPAKNNMYKLS - WDC	80
ASP-1 C	9	CPSNT - GMTDSVRDTFLSVHNEFRSSVARGLEPD - - ALGGNAPKAAKMLK MV - YDC	64
VAP-3	14	CSADFG - - SSGQNGIINAHNTLRSKIAKGT YVA - - KGTQKSPGTNDLKKMK - WDS	66
MSP-1	15	IYTVVNSLT VPEQNAVVDICIN KYRSQLANGCKTKN - - KNGGNFSPSGND L EYVS - YSKD	71
VAP-1 N	77	KAQEWADGQ PSSFQT - - FDPT - - WGQNYATYMGSI - - ADPLPYASM AVNGWWS	129
VAP-1 C	71	NAKIWAKGCLYQHSTSAQRPG - - LGENLYMISINN - - MPKIQTAE DSSKAWWS	125
VAP-2 N	115	LAANWSTSC PQHFMPQSVLGS - - NAQLFKRFYFYFDGH DSTVHMRNAMKYWWQ	171
VAP-2 C	60	FAQNVANNVCVFAHSAHYERP N - - QGQNTLMSSFSN - - PDPRSLIHTAVEKWWQ	114
ASP-1 N	81	QLQDAIQSCPSAFAG - - IQG - - VAQNVMSWSSSGGFPDP SVKIEQ TLSGWWS	134
ASP-1 C	65	SAIRHGNKCYVQHSHGEDRPG - - LGENLYKTSVLK - - FDKNKAAKQASQLWNNELKE	119
VAP-3	67	SAQNYANGCPTGHS G - - DAG - - LGENTLYWYWTSGSLGD LNQYGSAA	120
MSP-1	72	SAQRWANKC IFDHNGTDLYSGGKFYGENLYLDGDFEH - KNITQLMIDA	130
VAP-1 N	130	LT D - - - - PDNK - - YTNSA - - MFRFPANMANGKASAFGCAYALCAGKL - - - - S	172
VAP-1 C	126	VGSD - - - - NITQA - - VFDRG - - VGHYTQMAWEGTTEIGCFYENCPTFT - - - - Y	171
VAP-2 N	172	NEDQ - - - - KNR - - FYARRN - - YFGWANMAKGRKYGYGCSYIMCGDGES - - - - A	217
VAP-2 C	115	TPID - - - - NVLTPE - - LWDLKGKAI GHYTQMAWDRYRLGGGTANCPKMS - - - - Y	163
ASP-1 N	135	VGPD - - - - N - - - - KYNGGG - - LFATSNM VYSETTKLGCAYKVC	176
ASP-1 C	120	VGPS - - - - NVLT TA - - LWNRPQM IGHYTQMAWDTTYKLGCAYVFCNDFT - - - - F	168
VAP-3	121	WKS - - - - NLMTID - - LFNTG - - IGHATQMAWAKSNLIGCGVKDCGRDSNGLNKVTV	171
MSP-1	131	VPPSWINNFLPTDNKENDEKFEAVGHWTOMAWAKTYQLGCATKVC	188
VAP-1 N	173	YNKI GYMTNAI IYRKGDAGTSDAEC TTY S - - DSQCKNGLCYKA - - - - -	213
VAP-1 C	172	YGPAGNYMNQLIYTKGSPOTADADCPGTQ - - TCSVAEALC - V - - IP - - - -	212
VAP-2 N	218	YNEKAQCEKEMIYENGKPCCEDEKDCFTYPGSKCLVPEGLCQAPSMVKDDGG	268
VAP-2 C	164	YGPAGNRKNNKIYIEIGDPC EVD DDCPIGT - - DCEKTTSLC - V - - ISK - - - -	205
ASP-1 N	177	YNGVGYITNQPMWETGQACKTGADDCSTYK - - NSGCEDGLCTKGP - - - - -	218
ASP-1 C	169	YGPFGGNYMGHVIYTMGQPCSS - - QCSFGA - - TCSVTEGLC - S - - A - - P - -	206
VAP-3	172	YKPPQGNFINQYIYVSGATCS - - GCPSGT - - SCETSTGLCV - - - - -	207
MSP-1	189	YYFGGNGMGSP IYQGGKPA S - - GCGKAG - - PSTKYSGLCKPDPHQNN - - - -	231

FIGURE 4: Schematic map of selected *C. elegans* *vap* genes



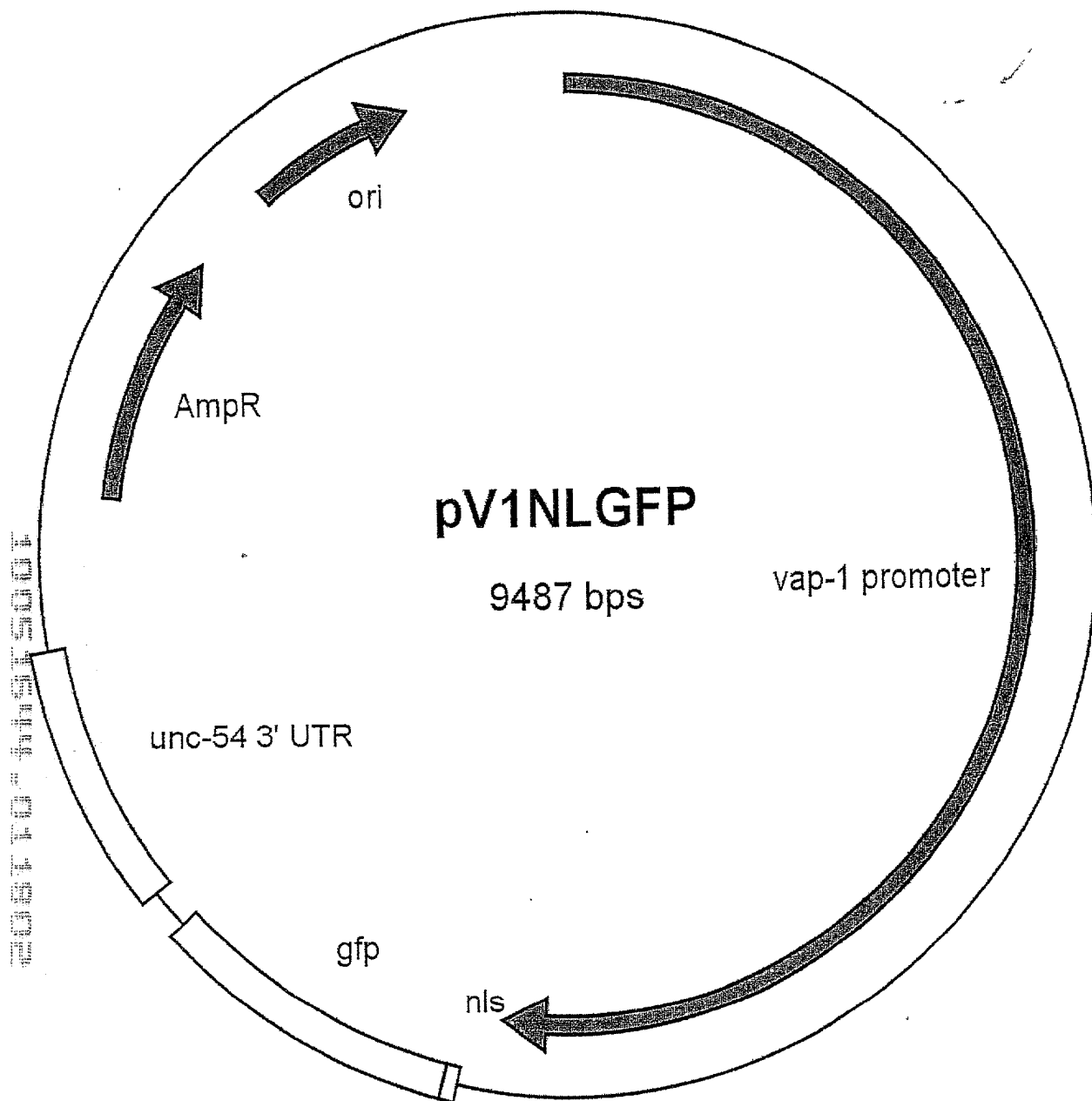


FIGURE 5A

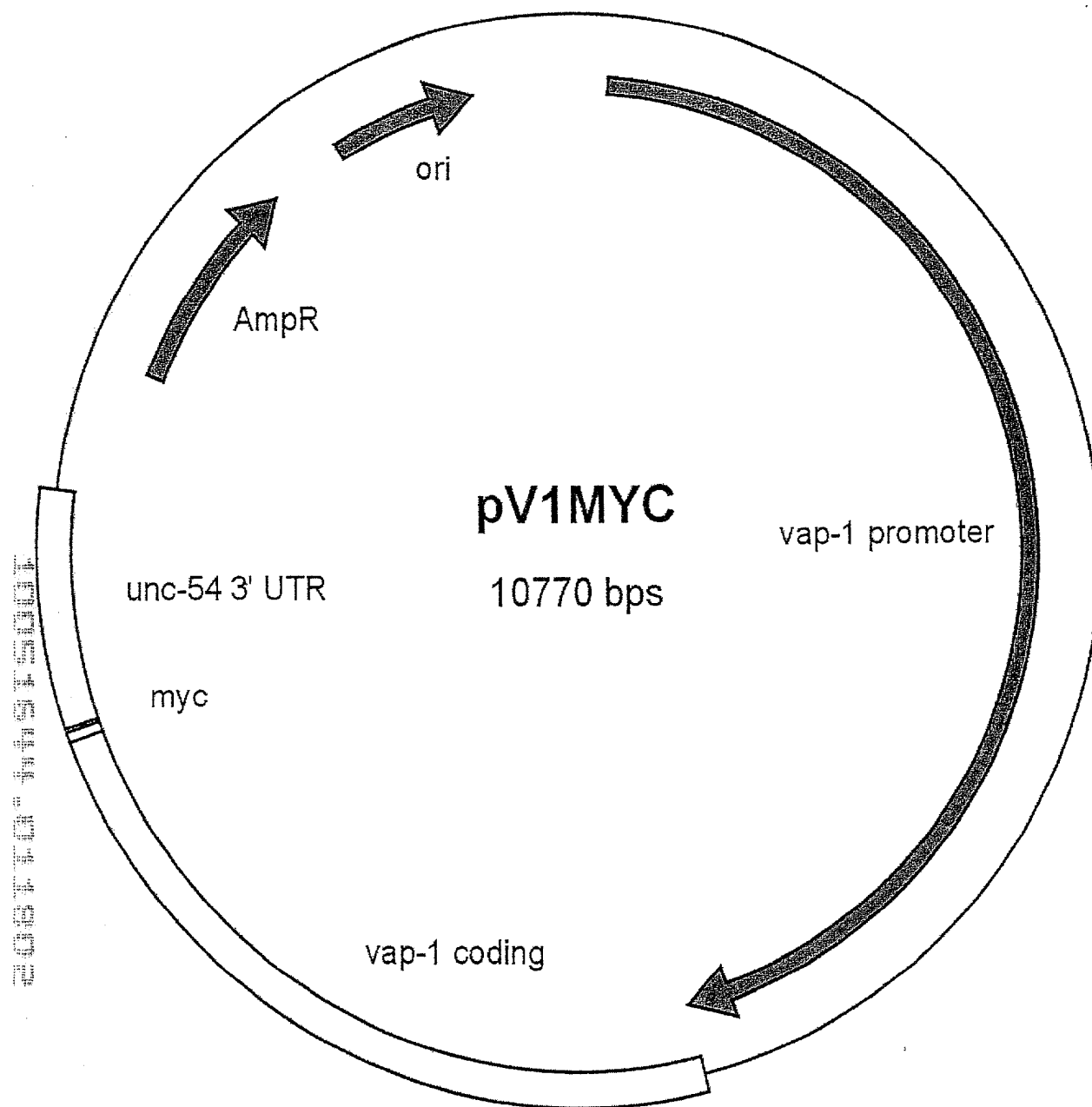


FIGURE 5B

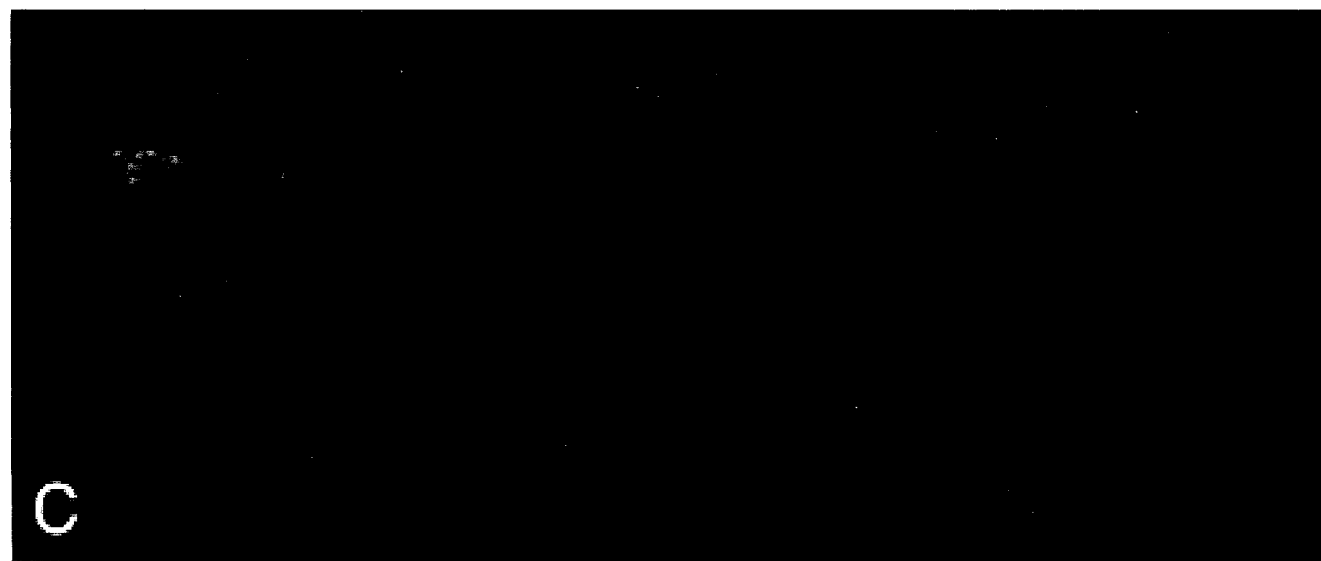
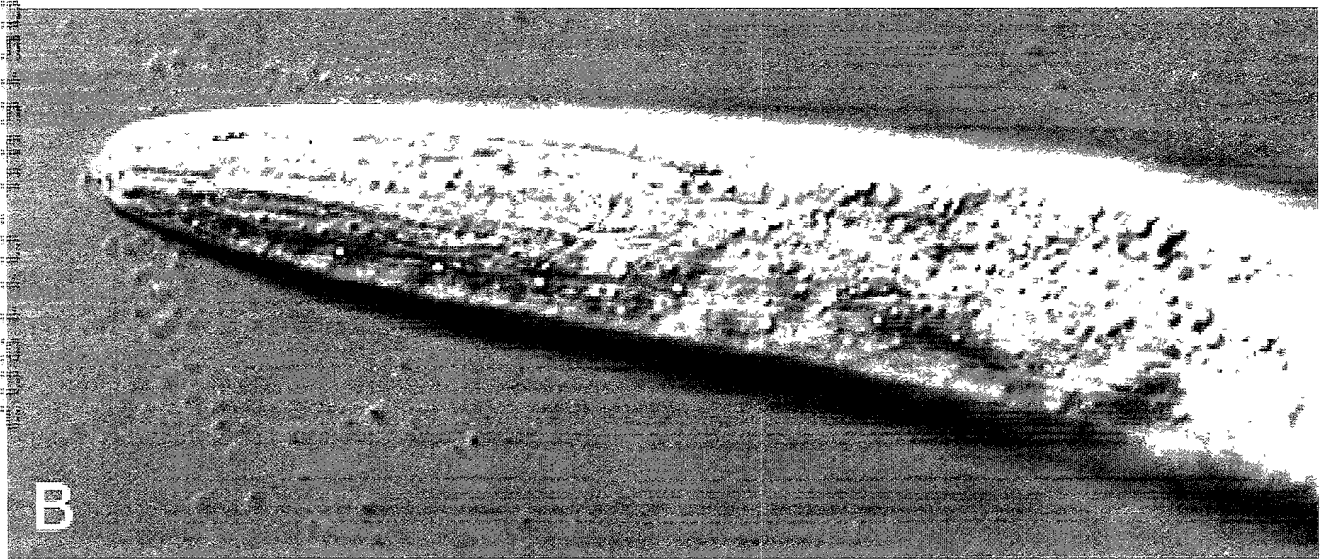


FIGURE 6

FIGURE 7

1

2

3

97 —

66 —

45 —

30 —

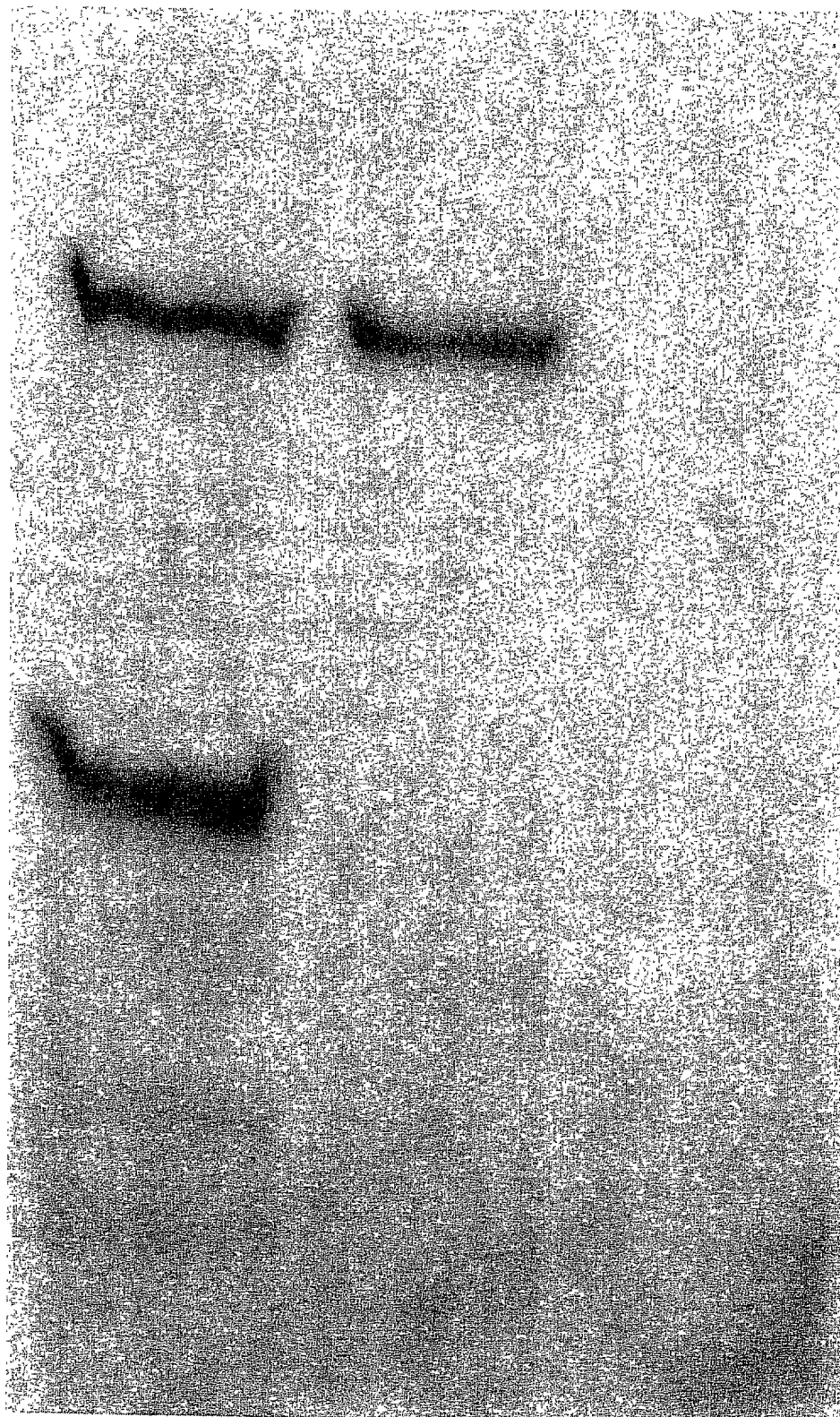
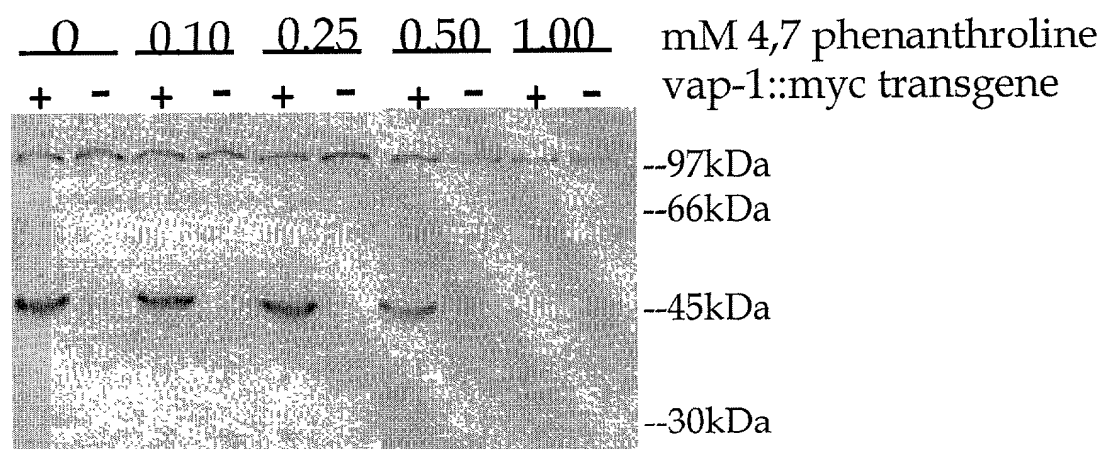


FIGURE 8



2003-10-10 10:00:00